Home Oxygen Therapy Under Medicare
A Primer

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Medicare recently implemented a new, strict, and complex home oxygen policy and a new oxygen prescription form. Unfortunately, the lack of instructions for the form has led to confusion, frustration, and suboptimal treatment. Long-term oxygen therapy prolongs survival, ameliorates hypoxic organ dysfunction, and improves exercise endurance. Indications for therapy include hypoxemia caused by cardiopulmonary diseases, hypoxemia that occurs with sleep or exercise, and hypoxemic organ dysfunction. Patients should be stable and have an arterial blood oxygen tension (Pa_{O_2}) of 55 mm of mercury (7.3 kPa) or less or arterial blood oxygen saturation (Sa_{O_2}) of 88% or less. There should be evidence of hypoxic organ dysfunction when the (Pa_{O_2}) is 56 to 59 mm of mercury (7.4 to 7.8 kPa) or the Sa_{O_2} is 89%. A medical review by the insurance carrier is required if oxygen is to be prescribed when hypoxemia is less severe—if the Pa_{O_2} is 60 mm of mercury (8.0 kPa) or more or if the Sa_{O_2} is 90% or more. The instructions for oxygen flow, duration, and equipment must be explicit to ensure adequate therapy. An oxygen concentrator with a small oxygen cylinder portable system fulfills most needs. Oxygen cylinders may be used at low flows for patients who require therapy only during sleep or where electrical power is unreliable. A liquid oxygen system may be prescribed for active patients. Portable equipment should be provided in addition to stationary equipment when patients have resting hypoxemia. Portable equipment alone is sufficient when there is exercise-related hypoxemia with normal oxygenation at rest. Newly developed oxygen-conserving devices may offer longer ambulatory times and possibly lower operating costs. When home oxygen therapy is started in the hospital, the Certificate of Medical Necessity should be completed and patients should be trained to use the equipment before discharge.

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The use of home oxygen therapy has increased dramatically because it is beneficial and the prevalence of lung disease is high.[1-3] An estimated 500,000 to 800,000 Americans use home oxygen at a cost of between $2 and $3 billion a year.[4] Alarmed by these high costs, the Health Care Financing Administration (HCFA or Medicare) in 1989 implemented a new policy to eliminate unnecessary and unreasonable prescription, simplify administration, and reduce costs.[5] This tightly regulated policy has affected services substantially because Medicare supports about 60% of the cost of home oxygen therapy.[4] The policy is complex and demanding despite the advice of health care professionals and medical equipment suppliers.[6-8] Therapy may not be supported without detailed justifications and may be suboptimal without specific instructions. That Medicare has not provided instructions for completing this form adds to the complexity and confusion. This primer presents experience dealing with Medicare-supported home oxygen therapy—that is, it is an unofficial guide. For practical reasons, we follow the outline of the HCFA Certificate of Medical Necessity for Home Oxygen Therapy (Figure 1).

Form HCFA-484 (5-90)—Attending Physician's Certification of Medical Necessity for Home Oxygen Therapy

Form HCFA-484 (5-90), available from the Medicare carrier (the local administrator, often Blue Cross/Blue Shield), serves as the prescription and justification for therapy (Figure 1). Enter information about the patient and vendor (supplier) at the top. Identify the form as "Initial" to start therapy, "Revised" to change therapy, or "Renewed" to continue therapy. Only a physician or physician's employee may complete the remainder. Medicare now forbids vendors from entering information because of concerns with inappropriate prescription.

Section 1—Pertinent Diagnoses, International Classification of Diseases, 9th Revision (ICD-9-CM), Codes, and Findings

Background

Two controlled, multicenter studies of hypoxemic patients with chronic obstructive pulmonary disease (COPD) have established the benefits of long-term, low-flow home oxygen therapy.[1,2] These include improved survival, improved neuropsychological function, and amelioration of polycythemia, pulmonary hypertension, and right-sided heart failure (cor pulmonale).[1-3] Oxygen therapy given "continuously" (more than 19 hours a day) halves the annual mortality of patients with COPD and cor pulmonale,[1] which is in excess of 65% over four years,[9] and is the only therapy known to do this. When oxygen is given for 12 to 15 hours a day, the benefit is reduced[1] and delayed.[2] Additional less convincing benefits include improved exercise endurance, reduced exercise-related dyspnea, fewer days in hospital, and the ability to resume gainful employment.[10,11]

Nearly all scientifically evaluated experience has been

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ABBREVIATIONS USED IN TEXT

Cao_2 = arterial blood oxygen content
COPD = chronic obstructive pulmonary disease
HCFA = Health Care Financing Administration
ICD-9-CM = International Classification of Diseases, 9th revision [Clinical Modification]
Pao_2 = arterial blood oxygen tension
Sao_2 = arterial blood oxygen saturation

obtained from patients with COPD who have hypoxemia at rest. The Health Care Financing Administration also accepts the treatment of hypoxemia caused by less well-studied conditions and that related to exercise or sleep.

Application

Select the pertinent diagnoses and findings. Cor pulmonale refers to jugular venous distention, liver engorgement, edema, or electrocardiographic changes of "P pulmonale" (the P wave exceeds 3 mm in leads II, III, and aVF), while polycythemia is defined as a hematocrit of 0.57 (57%) or more. When appropriate, enter the diagnosis and ICD-9-CM code for "other conditions" such as cystic fibrosis (277), pneumonia (480-486 by etiology), obstructive sleep apnea (780.53), kyphoscoliosis (737), pneumoconiosis (500-508 by etiology), or pulmonary carcinomatosis (162.8).

The Health Care Financing Administration excludes oxygen therapy for the following conditions: angina pectoris or breathlessness without hypoxemia or cor pulmonale, peripheral cyanosis due to vascular disease only, and terminal illness that does not affect the lungs.

Section 2—Dates of Last Examination and Prescription and Estimated Length of Need

Background

To eliminate unnecessary prescription, the continued medical need for oxygen therapy must be reviewed periodically. Cardiopulmonary disease should be stable before starting long-term therapy. Nearly half the Nocturnal Oxygen Therapy Trial patients who were classified as clinically stable candidates for home oxygen therapy showed sufficient improvement to stop oxygen therapy after a month of outpatient observation.[12] After an exacerbation of chronic lung disease, it is reasonable to start home oxygen therapy at

Department of Health and Human Services
Health Care Financing Administration

Form Approved
OMB No. 0938-0534

ATTENDING PHYSICIAN'S CERTIFICATION OF MEDICAL NECESSITY FOR HOME OXYGEN THERAPY *(Legible handwritten entries acceptable)*

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to HCFA, P.O. Box 26684, Baltimore, MD 21207; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Patient's Name, Address, and HIC No.

Supplier's Name, Address, and Identification No.

Certification: ☐ Initial ☐ Revised ☐ Renewed

INFORMATION BELOW TO BE ENTERED ONLY BY PHYSICIAN OR PHYSICIAN'S EMPLOYEE

1. Pertinent Diagnoses, ICD-9-CM Codes, and Findings - CHECK ALL THAT APPLY:
☐ Emphysema (492.8) ☐ Chronic Obstructive Bronchitis (491.2)
☐ COPD (496) ☐ Chronic Obstructive Asthma (493.20)
☐ Cor Pulmonale (416.9) ☐ Congestive Heart Failure (428.0)
☐ Interstitial Disease (515) ☐ Secondary Polycythemia (289.0)
☐ Other _____ ☐ Hematocrit 57% or more Yes☐ No☐
Specify Code

2.A. I last examined this patient for this condition on: ___/___/___ Month Day Year

2.B. Home oxygen prescribed: ___/___/___ Month Day Year

2.C. Estimated length of need: ☐1-3 months ☐4-12 months ☐ Lifetime

3.A. Results of Most Recent Arterial Blood Gas and/or Oxygen Saturation Tests (Patient Breathing Room Air)

	PO2	02 Saturation	Date
(1) At Rest			
(2) Walking			
(2) Sleeping			
(3) Exercising			
(4) Other :			

3.C. Physician/Provider Performing Test(s) *(Printed/Typed Name and Address)*:

3.B. If performed under conditions other than room air, explain:

NOTE: If PO2 Level exceeds 59 mm Hg or the arterial blood saturation exceeds 89% at rest on room air, the claim will be disallowed without compelling medical evidence. Check block ☐ if you have attached a separate statement on your letterhead of additional documentation.

4. Oxygen Flow Rate : ____ Liters per minute ☐ Continuous (24 hrs/day)
☐ Noncontinuous (Enter hrs/day): ____ Walking ____Sleeping ____Exercise Program ____Other (specify) _____

5. Oxygen Equipment Prescribed If you have prescribed a particular form of delivery, check applicable block(s). Otherwise leave blank.

A. Supply System
(1) Stationary Source ☐ Concentrator ☐ Liquid Oxygen ☐ Compressed Gas ☐ Other
(2) Portable or Ambulatory Source ☐ Liquid Oxygen ☐ Compressed Gas ☐ Other _____

B. Delivery System
☐ (1) Nasal Cannula
☐ (2) 02 Conserving Device
☐ Pulse 02 System
☐ Reservoir System
☐ Other _____
☐ (3) Transtracheal Catheter
☐ (4) Other _____

6. If you have prescribed a portable or ambulatory system, describe activities/exercise that patient regularly pursues which require this system in the home and which cannot be met by a stationary system (e.g., amount and frequency of ambulation).

CERTIFICATION

THE PATIENT HAS APPROPRIATELY TRIED OTHER TREATMENT MEASURES WITHOUT SUCCESS. OXYGEN THERAPY AND OXYGEN EQUIPMENT AS PRESCRIBED IS MEDICALLY INDICATED AND IS REASONABLE AND NECESSARY FOR THE TREATMENT OF THIS PATIENT. THIS FORM AND ANY STATEMENT ON MY LETTERHEAD ATTACHED HERETO HAS BEEN COMPLETED BY ME, OR BY MY EMPLOYEE AND REVIEWED BY ME. THE FOREGOING INFORMATION IS TRUE, ACCURATE, AND COMPLETE, AND I UNDERSTAND THAT ANY FALSIFICATION, OMISSION, OR CONCEALMENT OF MATERIAL FACT MAY SUBJECT ME TO CIVIL OR CRIMINAL LIABILITY.

Attending Physician's Signature: *(A STAMPED SIGNATURE IS NOT ACCEPTABLE)* Date:

Physician's Name, Address, Telephone No., and Identification No.:

Form HCFA-484 (5-90)

Figure 1.—Form HCFA-484 (5-90), the Attending Physician's Certification of Medical Necessity for Home Oxygen Therapy, is used to prescribe and justify home oxygen therapy. Except for information that identifies the patient, supplier, and type of certification, the form must be completed by the physician or physician's employee. Information is entered in several numbered areas that are described sequentially in the text.

discharge, provide optimal medical treatment, and evaluate the need to continue therapy after one to three months. If long-term therapy is required, an evaluation every six months is probably adequate.

Application

Physicians must assure the carrier that they are observing their patients closely and that the prescription is current. Our carrier accepts data from the previous month for initial certifications to start therapy, three months for revised certifications to increase or decrease therapy, and six months for renewed certifications to continue therapy even when there is a lifetime need. Our carrier rejects certificates with data that are more than six months old.

The estimated duration of need selected by the physician will affect recertification. See the discussion on "Recertification and Retesting."

Section 3A—Results of Arterial Blood Gas or Oxygen Saturation Tests

Background

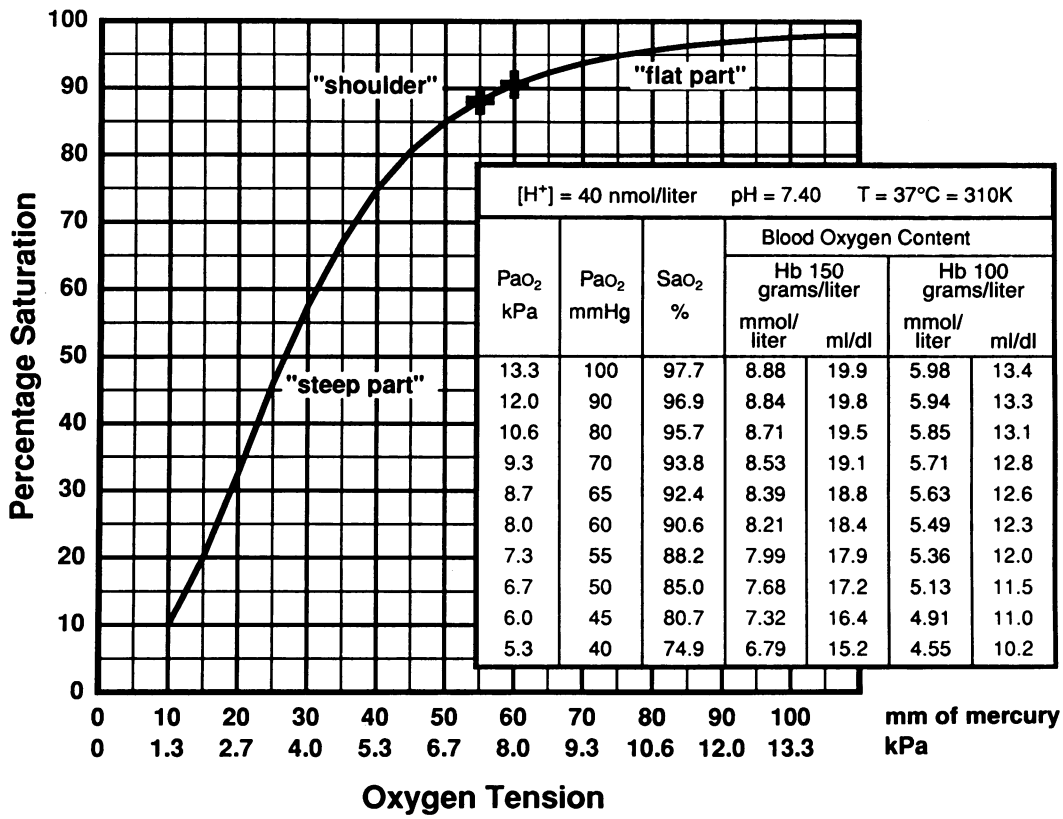
The recommendations for long-term oxygen therapy are based on pathophysiologic mechanisms, clinical observation, and technology. The hemoglobin-oxygen dissociation curve is a helpful mnemonic (Figure 2).[13] Arterial blood oxygen tensions (Pao_2) in the range of 55 to 60 mm of mercury (7.3 to 8.0 kPa) identify the shoulder of the curve that corresponds to arterial oxygen saturations (Sao_2) of 88% to 90% under normal conditions. When the Pao_2 drops acutely into this range, it is common to see abnormal neuropsychological function (impaired short-term memory and judgment), physiologic responses (hyperventilation, tachycardia, and pulmonary arterial vasoconstriction), and the initiation of chronic compensatory responses (secondary polycythemia).

Below the shoulder lies the steep part of the dissociation curve where small decrements in the Pao_2 produce large decrements in the Sao_2 and oxygen content (Cao_2). The risk for hypoxic organ dysfunction is high when hypoxemia is this severe. When the Pao_2 is 55 mm of mercury (7.3 kPa) or less, or when the Sao_2 is 88% or less, Medicare supports oxygen therapy without further justification.

Cor pulmonale may develop with less severe hypoxemia in some patients either for unknown reasons ("heightened sensitivity") or in association with known aggravating conditions, such as anemia or left-sided heart failure. Medicare supports oxygen therapy when the Pao_2 is in the range of 56 to 59 mm of mercury (7.4 to 7.8 kPa) or when the Sao_2 is 89% if there is hypoxic organ dysfunction such as cor pulmonale, P pulmonale, polycythemia, or impaired mental function.

Above the shoulder is the flat part of the dissociation curve where a large rise in the Pao_2 causes a small rise in Sao_2 and Cao_2 values. When the Pao_2 exceeds 70 mm of mercury (Sao_2 94%), there is little gain in oxygen content. Medicare refuses to support oxygen therapy when the Pao_2 is 60 mm of mercury (8.0 kPa) or more or when the Sao_2 is 90% or more unless the physician provides compelling evidence that oxygen therapy has clinical benefit.

It should be noted that Medicare liberalized the Sao_2



[H+] = 40 nmol/liter pH = 7.40 T = 37°C = 310K

Pao_2 kPa	Pao_2 mmHg	Sao_2 %	Blood Oxygen Content Hb 150 grams/liter mmol/liter	Hb 150 grams/liter ml/dl	Hb 100 grams/liter mmol/liter	Hb 100 grams/liter ml/dl
13.3	100	97.7	8.88	19.9	5.98	13.4
12.0	90	96.9	8.84	19.8	5.94	13.3
10.6	80	95.7	8.71	19.5	5.85	13.1
9.3	70	93.8	8.53	19.1	5.71	12.8
8.7	65	92.4	8.39	18.8	5.63	12.6
8.0	60	90.6	8.21	18.4	5.49	12.3
7.3	55	88.2	7.99	17.9	5.36	12.0
6.7	50	85.0	7.68	17.2	5.13	11.5
6.0	45	80.7	7.32	16.4	4.91	11.0
5.3	40	74.9	6.79	15.2	4.55	10.2

Figure 2.—The normal hemoglobin (Hb)-oxygen dissociation curve is given at normal temperature and pH: note the 3 parts of the curve: the steep part where a small change in arterial oxygen tension (Pao_2) causes a large change in saturation (Sao_2) and oxygen content; the flat part where a large change in Pao_2 causes a small change in saturation and content; and the intervening shoulder. The crosses at Pao_2 55 and 60 mm of mercury (7.3 and 8.0 kPa) identify the zone used by Medicare for supporting oxygen therapy in the home. In the columns to the right of the curve, note the deleterious effect of anemia on oxygen content.

criterion after experts argued that the old criterion (Sao_2 of 85% or less) was too strict.[8] Clinical (pulse) oximeters measure the Sao_2 noninvasively.[14] Some experts think, however, that oximeters are too inaccurate—the typical error range is 4%—to make decisions about long-term therapy.[15] For example, a Pao_2 of 54 mm of mercury (7.2 kPa) (Sao_2 88%) meets the criterion, but a reading of 90%—within error—in the absence of a measured Pao_2 does not. A susceptibility to erroneous readings, especially when carboxyhemoglobin is present, also limits the usefulness of oximetry.[14] A conservative approach is to use the Pao_2 when deciding to start or stop oxygen therapy and to use pulse oximetry when monitoring Sao_2 during sleep and when temporarily lowering or discontinuing oxygen until the Pao_2 is tested.[7]

Substantial hypoxemia (Pao_2 of 55 mm of mercury or less; Sao_2 88% or less) may develop only during sleep or exercise in some patients. Experts have recommended oxygen therapy during these activities with the hopes of preventing cor pulmonale,[11,16] but the evidence is limited. For example, the observation that patients with COPD and nocturnal oxyhemoglobin desaturation have greater hemodynamic abnormalities during rest and exercise than do patients without nocturnal desaturation supports the recommendation.[17] On the other hand, that the prognosis of patients with COPD was unaffected by not having nocturnal oxygen therapy is against the recommendation.[18] Controlled studies indicate that oxygen therapy increases exercise endurance and may relieve dyspnea in patients with COPD[19,20] and interstitial lung disease[21] who have exercise-related hypoxemia. Until there is more evidence to the contrary, HCFA supports the use of oxygen therapy only during the periods of hypoxemia.

Application

Enter the test date and results obtained with the patient breathing room air on the appropriate line depending on the test conditions as follows:

Line 1. If the Pao_2 is 56 to 59 mm of mercury (7.4 to 7.8 kPa) or if the Sao_2 is 89%, the findings of hypoxic organ dysfunction such as cor pulmonale, P pulmonale, and polycythemia should be checked in section 1. If the Pao_2 is 60 mm of mercury (8.0 kPa) or greater or the Sao_2 is 90% or more, the carrier must disallow the claim. See the discussion on "compelling medical evidence."

Lines 2 and 3. If hypoxemia occurs only during walking, sleeping, or exercising, Medicare supports therapy only during those "special conditions."

Line 4. Other conditions may include concomitant therapy with a mechanical ventilator or nasal continuous positive airway pressure generator.

Section 3B—Explanation if Tested Under Conditions Other Than Room Air

Background

Testing patients while they are breathing room air simplifies the task of the nonphysician reviewers. It may be inappropriate to permit a patient to undergo profound hypoxemia, for example, if the Pao_2 is barely adequate with large flows of oxygen.

Application

Describe briefly the rationale for doing tests while the patient is receiving supplemental oxygen.

Section 3C—Name and Address of Test Provider

Background

The Health Care Financing Administration is concerned about possible conflict of interest. The persons testing the need for oxygen therapy must not be those providing that therapy—that is, the fox should not guard the hen house.

Application

The vendor or anyone associated with the vendor may not perform the arterial blood gas or oximetry tests.

Section NOTE—Compelling Medical Evidence

Background

Nonphysician reviewers will disallow claims when the usual criteria are not met. For example, the claims of the following three patients with a Pao_2 of 61 mm of mercury (8.1 kPa), which is "too high," would be disallowed: Patient 1 lives 1,524 m (5,000 ft) higher than the blood gas laboratory; patient 2 has advanced interstitial lung disease and was receiving oxygen at 4 liters per minute when the Pao_2 was measured; and patient 3, who receives maximal therapy for angina pectoris, showed improved exercise tolerance on supplemental oxygen. The reviewers may not understand that the Pao_2 would fall into the qualifying range if patient 1 were tested at a higher altitude, that profound hypoxemia would certainly occur if patient 2 stopped supplemental oxygen, and that moderate hypoxemia may aggravate the angina afflicting patient 3. Patients and vendors usually urge the physician to submit a new Certificate of Medical Necessity, which often is disallowed again.

Application

Write a concise explanation on letterhead, provide supportive information, and request a review by the carrier's medical staff. It may help to inform the patient and vendor about this review.

Section 4—Oxygen Flow and Duration of Use

Background

The information on oxygen flow rate and duration is used to prorate reimbursement. Gross underestimates of flow and duration may severely limit reimbursement and lead to inadequate therapy. The hypoxemia of COPD usually responds well to low (less than 5 liters per minute) flows of oxygen. Most (93%) stable patients with COPD require 1 to 3 liters per minute at rest, and the most common flow is 2 liters per minute.[2,12,22] Low flows are tolerated well through a nasal cannula ("prongs"), aggravate alveolar hypoventilation infrequently, and are provided at home easily. The flow should raise the Pao_2 into the ideal range of 61 to 70 mm of mercury (8.1 to 9.3 kPa) or the Sao_2 to 91% to 94%.

Hypoxemia frequently worsens during sleep or exercise. Some patients who have normal oxygenation at rest require supplemental oxygen only during these activities. Experts advise patients who have hypoxemia at rest to raise the oxygen flow by an additional liter per minute during sleep or exercise.[1,22]

Application

Enter the liter-per-minute flow(s) and indicate the hours during which oxygen should be used—continuously (24

hours a day) or during specific activities. "Sleeping" should be for at least 12 hours because this duration of nocturnal oxygen therapy was shown to reduce mortality.[1] "Walking" implies ambulation outside the home, while "exercise program" implies the use of exercycles and calisthenics. The designation "prn" (for "as needed") is unacceptable.

Section 5A—Oxygen Equipment Prescribed: Supply System

Background

The new policy simplifies reimbursement, pays a flat rate for stationary equipment, and provides a small supplement (about $40 a month in Salt Lake City) for portable equipment. If equipment is not specified, the vendor may provide inconvenient (less expensive) equipment and not provide portable equipment. The consequences are using oxygen only part-time, which is less beneficial than continuous use,[1] worsening pulmonary hypertension when off oxygen therapy,[23] and becoming "shut in" and tethered to stationary equipment. Physicians should choose the equipment because it affects compliance with therapy, physical activity, and attempts at rehabilitation.[6-8,24-27]

Cylinders of compressed gaseous oxygen are ubiquitous. Most are made of heavy steel and hold small volumes of oxygen under high pressure—as much as 2,200 pounds per square inch (psi; 15,400 kPa). Typical stationary equipment used in the home includes a large (size H or K) cylinder, a flow regulator, and a dolly to support and move the cylinder safely. The H or K cylinder is about 1.5 m (5 ft) tall, weighs 68 kg (150 lb), holds 6,900 liters, and lasts less than 2.5 days at 2 liters per minute continuously. Portable equipment used outside the home during ambulation includes a small (size E) cylinder, regulator, and small dolly; this weighs about 9 kg (20 lb), contains 600 liters, and lasts about five hours at 2 liters per minute. When available, aluminum cylinders are lighter. Half-volume (D) cylinders weigh only about 4 kg (9 lb) and are convenient for patients who use low flows or conservers (see below). Patients usually do not fill cylinders because the high pressures are dangerous. Instead, empty cylinders are traded for full ones, causing problems with storage and delivery.

Liquid oxygen is compact—1 liter of liquid equals about 860 liters of gas—and the equipment is light. It is stored under low pressure (20 or 50 psi [140 or 350 kPa]) in special insulated reservoirs and boils slowly into gas. A typical stationary reservoir is about 1 m (3 ft) tall, weighs about 64 kg (140 lb), and contains enough oxygen to last a week at 2 liters per minute. Liquid oxygen is easily transfilled (transferred) to a miniature portable reservoir made by the same manufacturer (compatibility of connectors is a problem)[27] that weighs about 4.5 kg (10 lb) and lasts eight hours at 2 liters per minute. A compact version weighs about 3.2 kg (7 lb) and lasts half as long. Liquid oxygen may be available only in cities, becomes too expensive at flows over 3 liters per minute, and boils away even when the equipment is turned off.

A concentrator obtains oxygen from air with a zeolite molecular sieve. A typical concentrator looks (and sounds) like a small refrigerator, weighs 16 to 27 kg (35 to 60 lb), and has wheels for moving around the house. The more compact and quiet enricher uses a semipermeable membrane to provide 40% oxygen—the compensatory triple flow becomes disagreeable when oxygen requirements exceed 2 liters per minute. Concentrators and enrichers require electricity, operate under low pressure, cannot fill cylinders, and are usually not portable. Cylinders of oxygen are required for ambulation, power failure, and equipment malfunction. A small cylinder system is usually adequate, but an additional large cylinder emergency system is recommended where there are delays in restoring power or repairing equipment and for high flows that quickly deplete a small cylinder. Home oxygen delivery equipment has been described in detail elsewhere.[13,22,27]

Application

Choose equipment by need, availability, and cost.

Stationary source. Vendors and payers prefer concentrators because costs are low and the patient pays for the electricity (about $50 a month). Concentrators are best for nonambulatory patients who leave home infrequently. Patients may walk in confined areas with a 15-m (50-ft) oxygen extension hose or move the concentrator to a different room. Cylinders are best for nonambulatory patients who use low flows, such as 1 liter per minute, only during sleep or who live in areas with unreliable electrical power where concentrators are not feasible. Liquid oxygen is best for active patients who use oxygen continuously and leave home several times a week.[8] Some active patients who have exercise-related hypoxemia may also benefit from liquid oxygen.

Portable or ambulatory source. Prescribe portable equipment for patients who use oxygen continuously—that is, who have resting hypoxemia, or those who have exercise-related hypoxemia. Use small cylinders with a concentrator and a large-cylinder stationary system, or use a portable reservoir with a liquid oxygen stationary reservoir.

Section 5B—Oxygen Equipment Prescribed: Delivery System

Background

By convention, a nasal cannula is used with continuous flow therapy for comfort and convenience. Oxygen conservers are novel devices that extend oxygen supplies by about 50%, offer longer ambulatory times with portable equipment, and allow vendors to make fewer deliveries.[27,28] Pulse (demand valve) systems deliver oxygen only during inspiration and reduce waste during expiration. Reservoir systems save some of the oxygen delivered during expiration in a chamber adjacent to the nose (reservoir cannula) or on the chest (reservoir pendant), while a transtracheal catheter stores it in the trachea. Demand valves are set to the same conventional flow, while reservoirs and a transtracheal catheter use lower flows that are determined by monitoring the Pao_2 or Sao_2.

Medicare has not developed a consistent policy for conserving devices. For example, our carrier supports the transtracheal catheter but does not support the reservoirs or demand valve. The new half-rate payment policy for flows less than 1 liter per minute discourages the use of reservoirs and transtracheal catheters that operate with lower flows. Medicare may modify its policy when it better understands the value of conserving devices.

Other ways to deliver oxygen include a tracheostomy adapter, tracheostomy mask, ventilator connector, and nasal continuous positive airway pressure adapter. A pulmonologist or respiratory therapist may offer valuable advice for working with this special equipment.

Application

Select the delivery system. Indicate the new lower flow for reservoir and transtracheal conserving systems.

Section 6—Description of Activities That Require a Portable System

Background

As noted earlier, portable oxygen equipment is needed to maintain therapeutic benefit in patients who are hypoxemic at rest or who have exercise-related hypoxemia. Mobility is important to maintain conditioning and social activities.[10,13,22,27] The failure to use oxygen when away from home reduces therapeutic benefit and increases the risk of morbidity and mortality. Medicare requires justification of the added expense.

Application

Indicate briefly that portable oxygen is required to maintain therapeutic benefit when away from home and specify the hours to be spent walking, exercising, or traveling.

Recertification and Retesting

The following guidelines became effective July 1, 1991. Physicians are required to submit a renewed Certificate of Medical Necessity based on the estimated duration of need that was indicated in Section 2. This must be done in the 3rd month, 9th month, and annually for the estimated durations of need of 1 to 3 months, 4 to 12 months, and lifetime, respectively. Retesting is required in the third month if the initial Pao_2 is at or above 56 mm of mercury or the Sao_2 is at or above 89%. Subsequent retesting is not mandatory but should be reported when performed.

Other Considerations

Always provide optimal medical therapy that includes the cessation of smoking, the appropriate use of bronchodilators, antimicrobials, and corticosteroids, and the treatment of problems known to aggravate hypoxemia, such as congestive heart failure.[11,13,16,22]

When home oxygen therapy is started in the hospital, the Certificate of Medical Necessity should be completed before discharge.[8] Physicians should use the technical expertise of respiratory therapists who have worked closely with their patients. Indeed, a respiratory therapist who works for the physician or medical center may now complete the form for later physician review and signature. The major advantage of careful discharge planning is that the vendor, often a respiratory therapist, will have enough time to train the patient and family in the proper use of equipment. Patients will also have a chance to learn the benefits of oxygen therapy: to prevent heart damage and other complications, improve mental and muscle function, and prolong life.[13,22] Finally, patients should be advised to use oxygen as prescribed to obtain full benefits of therapy and avoid misguided attempts to use less than prescribed flows or to use it only "as needed."

It is sad that the new Medicare policy and reporting form are a response to past abuses that had reached "scandalous" levels.[29] Physicians should send complaints and recommendations to HCFA if the oxygen policy continues to be burdensome.[8]

REFERENCES

1. Nocturnal Oxygen Therapy Trial Group: Continuous or nocturnal oxygen therapy in hypoxemic chronic obstructive lung disease. Ann Intern Med 1980; 93:391-398
2. Medical Research Council Working Party: Long term domiciliary oxygen therapy in chronic hypoxic cor pulmonale complicating chronic bronchitis and emphysema. Lancet 1981; 1:681-686
3. Timms RM, Khaja FU, Williams GW, and the Nocturnal Oxygen Therapy Trial Group: Hemodynamic response to oxygen therapy in chronic obstructive pulmonary disease. Ann Intern Med 1985; 102:29-36
4. O'Donohue WJ Jr: The future of home oxygen therapy. Respir Care 1988; 33:1125-1130
5. Department of Health and Human Services Health Care Financing Administration: Medicare program: Coverage of oxygen for use in a patient's home. Federal Register 1985; 50:13,742-13,750
6. Conference Report: Problems in prescribing and supplying oxygen for Medicare patients. Am Rev Respir Dis 1986; 134:340-341
7. Conference Report: Further recommendations for prescribing and supplying long-term oxygen therapy. Am Rev Respir Dis 1988; 138:745-747
8. Conference Report: New problems in supply, reimbursement, and certification of medical necessity for long-term oxygen therapy. Am Rev Respir Dis 1990; 142:721-724
9. Renzetti AD Jr, McClement HS, Litt BD: The Veterans Administration cooperative study of pulmonary function—III. Mortality in relation to respiratory function in chronic obstructive pulmonary disease. Am J Med 1966; 41:115-129
10. Petty TL, Neff TA, Creagh CE, et al: Outpatient oxygen therapy in chronic obstructive pulmonary disease—A review of 13 years' experience and an evaluation of modes of therapy. Arch Intern Med 1979; 139:28-32
11. Fulmer JD, Snider GL: ACCP-NHLBI national conference on oxygen therapy. Chest 1984; 86:234-247
12. Timms RM, Kvale PA, Anthonisen NR, et al: Selection of patients with chronic obstructive pulmonary disease for long-term oxygen therapy. JAMA 1981; 245:2514-2515
13. Shigeoka JW: Practical prescription of home oxygen therapy, *In* Stults BM, Dere WH (Eds): Practical Care of the Ambulatory Patient. Philadelphia, Pa, WB Saunders, 1989, pp 467-476
14. Schnapp LM, Cohen NH: Pulse oximetry—Uses and abuses. Chest 1990; 98:1244-1250
15. Carlin BW, Clausen JL, Ries AL: The use of cutaneous oximetry in the prescription of long-term oxygen therapy. Chest 1988; 94:239-241
16. Anthonisen NR: Long-term oxygen therapy. Ann Intern Med 1983; 99:519-527
17. Fletcher EC, Luckett RA, Miller T, Fletcher JG: Exercise hemodynamics and gas exchange in patients with chronic obstructive pulmonary disease, sleep desaturation, and a daytime Pao_2 above 60 mm Hg. Am Rev Respir Dis 1989; 140:1237-1245
18. Connaughton JJ, Catterall JR, Elton RA, Stradling JR, Douglas NJ: Do sleep studies contribute to the management of patients with severe chronic obstructive pulmonary disease? Am Rev Respir Dis 1988; 138:341-344
19. Woodcock AA, Gross ER, Geddes DM: Oxygen relieves breathlessness in 'pink puffers.' Lancet 1981; 1:907-909
20. Bradley BL, Garner AE, Billiu D, Mestas JM, Forman J: Oxygen-assisted exercise in chronic obstructive lung disease. Am Rev Respir Dis 1978; 118:239-243
21. Bye PTP, Anderson SD, Woolcock AJ, Young IH, Alison JA: Bicycle endurance performance of patients with interstitial lung disease breathing air and oxygen. Am Rev Respir Dis 1982; 126:1005-1012
22. Petty TL: Prescribing Home Oxygen for COPD. New York, NY, Thieme-Stratton, 1982
23. Selinger SR, Kennedy TP, Buescher P, et al: Effects of removing oxygen from patients with chronic obstructive pulmonary disease. Am Rev Respir Dis 1987; 136:85-91
24. Lertzman MM, Cherniack RM: State of the art: Rehabilitation of patients with chronic obstructive pulmonary disease. Am Rev Respir Dis 1976; 114:1145-1165
25. Moser KM, Bokinsky GE, Savage RT, Archibald CJ, Hansen PR: Results of a comprehensive rehabilitation program. Arch Intern Med 1980; 140:1596-1601
26. Hughes RL, Davison R: Limitations of exercise reconditioning in COLD. Chest 1983; 83:241-249
27. Tiep BL: Long-term home oxygen therapy. Clin Chest Med 1990; 11:505-521
28. Tiep BL, Lewis MI: Oxygen conservation and oxygen-conserving devices in chronic lung disease. Chest 1987; 92:263-272
29. Greentree LB: Home oxygen therapy—A proposal. Am Rev Respir Dis 1985; 131:932-933